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ABSTRACT

A study investigated and compared the acquisition of specialized vocabulary among English-as-a-Second Language (ESL) and native English-speaking (NES) graduate students in theology. Research was undertaken in an anglophone city in central Canada. Subjects were 12 students (5 Chinese ESLs, 7 NESs) enrolled in an introductory core theology course. A list of over 100 specialized theological terms was compiled from previous students' class notes, class handouts, and four texts to be used in the course, and a vocabulary test was developed. The test asked examinees to identify, from a list, terms that were theology-related, and to rate their level of familiarity with a list of terms. Participating students were tested at the beginning and end of the term. Subtest scores for all 12 subjects are charted. Results show that both ESLs and NESs began their study at the institution with considerable breadth of knowledge of specialized theological vocabulary, and that all but one had increased that knowledge. ESLs began study with less breadth and depth than their NES counterparts; the gap in breadth closed by the end of the course, but the discrepancy in vocabulary depth increased. Individual students' progress is discussed. The test is appended. Contains 64 references. (MSE)

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Vocabulary Acquisition in an Academic Discipline: ESL Learners and Theology[1]

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Introduction

Perusal through the literature in second language (L2) education reveals general agreement on the importance of vocabulary in L2 learning and teaching (Lessard-Clouston, in press a; Lewis, 1993; Meara, 1996), especially in English as a second- or foreign- language (ESL/EFL). However, it also reveals the absence of empirical studies on natural L2 academic vocabulary learning and use in an L2 beyond the L2 classroom. This paper, by describing a small part of a larger study (Lessard-Clouston, in progress), aims to help begin to bridge this gap by outlining a descriptive case study of both ESL and native-English speaking (NES) students' knowledge and acquisition of specialized vocabulary in one academic context. In order to do so, background for the study will first be provided through an overview of the relevant literature on vocabulary acquisition and the process of socialization into one's academic discourse community. Then the case study context, methods, assessment measures, and findings will be outlined. Finally, a discussion of these results will briefly consider their implications for ESL and English for Academic Purposes (EAP) education.

Background

Vocabulary Acquisition

In recent years a number of helpful resources have appeared which focus on vocabulary learning and teaching, especially for ESL and EFL settings (i.e., Hatch and Brown, 1995; Lewis, 1993; McCarthy, 1990; Nation, 1990 and 1994). At the same time, a significant amount of research on L2 vocabulary acquisition in a variety of settings has been carried out and published (see for example, Arnaud and Bejoint, 1992; Harley, 1995 and in press; Huckin, Haynes, and Coady, 1993; Meara, 1992a; Schmitt and McCarthy, forthcoming; Schreuder and Weltens, 1993). The appearance of these resources and studies reflects the fact that vocabulary, both in terms of acquisition and pedagogy, has begun to attain a position of greater prominence within applied linguistics and L2 education. In promising ways, L2 pedagogy and research increasingly recognize that "lexical competence is at the heart of communicative competence" (Meara, 1996, p. 35).

Much of the recent work on L2 lexis focuses on vocabulary size, growth, and use. Within a helpful framework relating these different aspects of vocabulary, Nation (1993) makes four points. First, one's "skill in language use depends on vocabulary size," and one should thus be familiar with high frequency words and "the general academic vocabulary that is common in many academic disciplines" (Nation, 1993, pp. 118 & 120). Second, as a person's "knowledge of the world depends on skill in language use," knowing many words is not enough; it is also "necessary to have fluent access to that vocabulary" (p. 120). Third, a person's "vocabulary growth is affected by knowledge of the world" (p. 121). Beyond high frequency and general academic words, therefore, one needs to "deal with the specialized technical vocabulary that is peculiar to a particular field of study" (p.

121). In this case, "knowledge of vocabulary is a result of mastery of the field" (p. 123). Fourth, an individual's "broad vocabulary growth depends on vocabulary [learning] strategies that are independent of subject matter," due to the large number of words in a language. In English, for instance, someone who learns the high frequency words, general academic and specialized vocabulary of his or her field will nonetheless encounter a significant number of the "123,000 low frequency words. It is this large number of words which accounts for a very small proportion of text coverage which is the source of a broad vocabulary" (Nation, 1993, p. 128).

Vocabulary and Academic Socialization

A growing number of recent studies from various perspectives within applied linguistics have pointed out the importance of "general academic words" and "specialized technical vocabulary" in the socialization of both first (L1) and L2 learners into their academic discourse communities (i.e., Berkenkotter and Huckin, 1995; Bourdieu, Passeron and de Saint Martin, 1994; Connor and Mayberry, 1996; Ferris and Tagg, 1996; Hazenberg and Hulstijn, 1996; Laufer, 1989, 1992; Parry, 1991, 1993; Prior, 1991). Although Xue and Nation's (1984) university word list exists, Zimmerman and Scarcella (1996) point out that "not everyone agrees on the specific vocabulary used in university settings and the boundaries between categories are fuzzy...". Nation and Hwang (1995), for example, distinguish four types of lexis, namely high frequency, academic, technical, and low frequency. They then declare that these categories are not clearly separable: "Any division is based on an arbitrary decision on what numbers represent high, moderate, or low frequency, or wide or narrow range, because vocabulary frequency, coverage and range figures for any text or group of texts occur along a continuum" (Nation and Hwang, 1995, p. 37). Zimmerman and Scarcella (1996) suggest that three types of vocabulary "are characteristic of academic language: *general words* that are used across academic disciplines (as well as in everyday situations outside of university settings), *technical words* that are used in specific academic fields and *nontechnical*...words that are used across academic fields". The present study is largely concerned with the technical (Hwang and Nation, 1995; Zimmerman and Scarcella, 1996) or specialized vocabulary of theology.

Beyond the studies noted above, several others provide background for the present paper. In a case study of Keiko, a Japanese ESL undergraduate studying sociology, Grace (1994) found that the largest number of errors in her course papers were lexical -- both of regular English nouns, verbs, phrases, or clauses and in relation to sociology-specific terms. Similarly, Casanave's (1992) research on an ESL student in a doctoral programme in sociology makes clear that "acquiring the culture of a disciplinary community involves learning that community's specialized language..." (p. 159). First, both L1 and L2 students struggled to learn "sociology as a second language", and second, "the language...identified the students as a group that was being brought into the fold, so to speak" (p. 159). The specialized

language of their core sociology courses "consisted of code words (terminology), acronyms, symbols, and certain constrained sentence types" (p. 160). As Swales (1990) has suggested, the specialized language here provided the students in Casanave's (1992) study with a vocabulary, or "key code words", that were essential to their communication within their academic discourse community, both in course work (in readings, written assignments, and presentations) and later in their dissertations (p. 160). From her data, Casanave (1992) was able to compile a list of the many specialized key terms she found in the two core sociology courses, and the importance of this vocabulary is evident in the fact that it appeared in the first lectures and was used throughout the school year (pp. 160-161).

The above background leads to the rationale for the current study. Vocabulary is not only crucial to L1 and L2 acquisition and use; it is also key in the socialization of large numbers of ESL students into their chosen academic disciplines at various levels in English-medium colleges and universities throughout North America and other parts of the world. Yet more information is needed about these disciplinary contexts, particularly what specialized vocabulary is required within them and what knowledge L1 and L2 students have about it both as they begin the socialization process into their academic discourse community and after they complete core courses in their chosen field. With this understanding, the following study was carried out in order to address the need for research into natural L1 and L2 English acquisition of specialized vocabulary in one academic context.

THE CASE STUDY

The Context

The academic context for this study was a major graduate school of theology (**GST**) in a anglophone city in central Canada. A **GST** was chosen for two main reasons. First, research has been or is already being conducted into ESL students' socialization into academic discourse communities in the applied and biological sciences (Lo, 1992, Shaw, 1991) and social sciences, particularly sociology (as noted above) and education (Prior, 1991; Riazi, 1995). However, apart from research on academic socialization in rhetoric and composition (i.e., Ackerman, 1995; Berkenkotter, Huckin, and Ackerman, 1988; Flower, 1990), few studies within the humanities are known to the present author. In particular, theology is a discipline with many L2 learners (some 40% of the student body at the **GST**), but to date it appears to have been neglected by applied linguists and educational researchers. Second, theology is a discipline with which the researcher is somewhat familiar, as he holds a Master's degree in the field.

Since research outlined above by Casanave (1992) and Grace (1994) has revealed the particular importance of specialized vocabulary in core undergraduate and graduate courses, the specific context for the present study was the core theology course in the **GST**: Systematic Theology I. This is a required class for all degree students and is recommended for others. As

a result, most new students take it during the first term of their academic programme. The course description for Systematic Theology I in the **GST** bulletin reads as follows: "An introduction to the systematic study of Christian doctrine according to the evangelical tradition. Topics covered include prolegomena, revelation and holy Scripture, the doctrine of God, creation, humanity, and sin" (p. 56). At the **GST**, the Systematic Theology I course is normally taught in the fall term, and then followed by Systematic Theology II during the winter term.

Participants

As the largest ESL populations at the **GST** are of Chinese and Korean backgrounds, it was decided to ask ESL students from these groups, as well as a number of NESs, to participate in the study. In order to do so the researcher attended the September 1994 orientation for new **GST** students and the first Systematic Theology I class. On both occasions he gave a brief introduction to the study and asked any interested students of Chinese, Korean, or NES background who were enrolled in the Systematic Theology I course to contact him afterwards. In response, 12 people volunteered, including five Chinese ESL students and seven NESs. Despite some interest, no Korean students volunteered. As a result, the ESL participants were all Chinese with either Cantonese, from Hong Kong (4), or Mandarin, from Singapore (1), as their L1. Four had immigrated to Canada, in periods from seven months to ten years before the study, and one was a foreign student who had just arrived from the United States the week before classes began. All of the NESs were born and educated in English in Canada, but came from a variety of backgrounds, including one ethnic Chinese. Except for two volunteers, Eve and Don, all of the participants were full-time students at the **GST** when the study took place[2].

All participants were beginning of the process of academic socialization into their chosen theological discourse community, the **GST**. They ranged in age from under 25 to over 55, with one third (1 ESL/3 NESs) proceeding directly from undergraduate studies in sociology, psychology, mathematics, and international development respectively, and the rest returning to graduate studies after working in the fields of anesthetism and banking (both ESL), administration, bookkeeping, warehouse supervision (one NES participant each), and English language teaching (1 NES and 2 ESL participants). All had at least an undergraduate degree, two (1 ESL/1 NES) held Master's degrees (in business and English respectively), and five also held special diplomas in anesthetism, human resource management, and English education (1 NES/2 ESL participants). Except for one whose status was "unclassified", all participants were beginning studies towards either a two year Master of Theological Studies (M.T.S.) or three year Master of Divinity (M.Div.) degree.

Research Questions

The present study aimed to answer two main research questions. First, how well do ESL and NES students know a sample

of specialized theological vocabulary, 1) as they enter their discourse community, and 2) at the end of their first core course, as evidenced in their beginning- and end-of-course scores on a *Test of Theological Language* (TTL)? Second, in what ways are ESL and NES students' knowledge and acquisition of this specialized vocabulary similar and/or different? The first research question seeks to determine how well participants know a sample of this vocabulary as reflected in their performance on two different measures (word identification and vocabulary knowledge scale) of breadth and depth of vocabulary knowledge in the TTL at the beginning and end of their first core theology course. It is anticipated that any improvement on the second TTL may also reflect acquisition of the specialized vocabulary of the **GST**. The second research question aims to provide quantitative and qualitative data about what aspects of specialized vocabulary knowledge the ESL and NES participants do and do not share.

Methodology

Baseline Data on Theological Vocabulary

In order to answer these research questions and to develop the test involving specialized theological vocabulary, baseline data was collected from two sources in the summer of 1994. The first was two previous **GST** students' written class notes and the hand-outs they received in their Systematic Theology I course as it was taught a) by the current professor and b) by another theology professor the year before the study, while the professor involved was on sabbatical. The researcher examined these materials for the theological vocabulary within them, and noted specialized terms used and the frequency with which they occurred. The second source of data involved the four texts to be used in the autumn Systematic Theology I course. One was a book of readings in Christian theology edited by Hodgson and King (1985), and the other three were introductory theology texts from a variety of viewpoints, by Grenz (1994), McGrath (1994), and Migliore (1991)[3]. After obtaining copies of these texts, the researcher examined a) the table of contents and b) the topic or subject index of each, in order to compile a list of specialized vocabulary that appeared in the previous students' course notes and in at least one of the four texts. In the end, the list included over 100 specialized theological terms[4].

Developing A Test of Theological Language

Once the list of specialized theological terminology was compiled, a pilot Test of Theological Language (TTL) was developed with two sections. In order to obtain an indication of participants' overall knowledge (breadth) of this theological vocabulary, the first section simply asked participants to identify all words or phrases they believed to be *theological*. However, in order to consider something of participants' depth of vocabulary knowledge (see Nagy and Herman, 1987; Paribakht and Wesche, 1996; Read, 1987, 1988, and 1993; and Wesche and Paribakht, in press), the second section involved a list of 10 real theological terms and asked participants to indicate their

knowledge of this specialized vocabulary, using the following scale: (a) they do not remember seeing the word or phrase before, (b) they have seen it before but do not know what it means, (c) they have seen it before, think they know what it means, and can provide a paraphrase, synonym, or translation, or (d) they know it and are able to give a paraphrase, synonym, or translation, or (e) they know it and are able to use it in a sentence (adapted from Paribakht and Wesche, 1993[5]). Pilot TTL takers were also asked to use the word in a sentence if they selected (d).

The first section of the TTL, *word identification* (WI), was modelled after the YES/NO test outlined in Meara and Buxton (1987), which included two types of words: 60 real L2 words and 40 pseudo-words that follow target language lexical patterns. A test-taker simply checks off the words in the L2 that he or she knows. Then in scoring the test, the number of correct target words (or 'hits') is adjusted downwards by the number of pseudo-words ('misses') a participant also checked, using a formula based on signal-detection theory (see Anderson and Freebody, 1983; Zimmerman, Broder, Shaughnessy and Underwood, 1977). Further details about the rationale behind this test format are outlined in Meara, Lightbown and Halter (1994) and Meara (1996).

A major difference exists, however, between the Meara and Buxton (1987) test and the WI section in the TTL used here. Rather than using 40 pseudo-words as distractors, the present word identification test used specialized vocabulary from four other academic disciplines: applied linguistics, economics, environmental engineering, and medicine. There were two main reasons for this difference. First, it was originally difficult to create an adequate number of appropriate pseudo-words which may have been viewed as specialized theological terms. Second, as the aim of the current study was to examine *specialized* vocabulary acquisition in an academic discipline, it was deemed appropriate to use specialized terms from other disciplines rather than pseudo-words. As a result, the researcher consulted three specialized dictionaries in applied linguistics (Richards, Platt, and Platt, 1992), economics (Pearce, 1986), and medicine (Havard, 1990) to compile lists of possible distractors from those disciplines. In the case of environmental engineering, a professor in that field provided a list of 23 specialized terms. Then from among all of the possible distractors, 10 representing each of the four fields were selected.

In order to further establish the specialized nature of the theological vocabulary items selected, only terms deemed to be specialized by their inclusion in one of two major theological dictionaries, either Elwell (1984) or McGrath (1993), were then included in the 70 chosen for the TTL. Of that number 60 were used in the WI section, with 10 in the vocabulary knowledge scale (VKS) section. Together with the 40 distractors, the 60 WI theological items were ordered randomly. For the VKS section, words or phrases were listed alphabetically. This TTL was then pilot tested with three ESL and three NES volunteers who had varying levels of knowledge about theology. The TTL appeared to produce the desired effect, and was only modified slightly[6]. One

important discovery, however, in piloting the TTL was that several people who had checked off (a) or (b) for certain items in the VKS section nonetheless went on to use the item correctly in an example sentence both syntactically and semantically. As a result, the revised VKS directions were changed to read: "If at all possible, please make a sentence for each word, especially if you choose either (c) or (d)", with no (e) choice[7]. The complete TTL, with both sections, is reproduced as an Appendix.

Procedures

During the first two weeks of Systematic Theology I in September, the researcher met individually with each participant in the library, lounge or a classroom at the **GST**, where he or she then spent an average of 20 minutes writing the TTL. This process was repeated again at the end of the term in December, when participants spent on average 25 minutes completing the TTL. After giving the tests in September it was discovered that through an oversight one of the theological words, "hamartiology" (the doctrine of sin), in the WI section of the test had somehow been changed to "harmatology". In order to obtain comparable test results, it was decided to leave the second TTL as it was.

At a later date participants' TTL results were calculated. In the case of the WI section, "harmatology" was considered a distractor and scores were calculated using the formula presented in Meara and Buxton (1987). For the VKS section, the researcher rated the responses largely following Paribakht and Wesche's (1993 and 1996) scoring system. Participants received one point for each item for which they had checked (a), two points for (b) items or for (c), (d), and sentence items whose paraphrase or use was deemed incorrect, three points for items marked (c) and paraphrased correctly, and four points for (d) items paraphrased appropriately or for sentences in which the item was used semantically but not grammatically correctly. Five full points were given for all items that were used both semantically and grammatically appropriately in a sentence[8]. In doing so, a subset of 25% of the data (three beginning- and three end-of-term tests) was randomly selected and scored by a second rater[9]. With the WI section, there were no discrepancies, and all beginning- and end-of-term WI scores were verified to be correct. For the VKS section, out of 60 scoring judgements (ten words X six tests), the two raters agreed on 55, for an inter-rater reliability rating of 92%. In order to compare the two sections of the test, the scores for the WI section were multiplied by 100 in order to produce a percentage score, and the VKS scores (originally out of 50) were doubled in order to provide a percentage score.

Findings

Participants' scores on the beginning- and end-of-term Tests of Theological Language (TTL-1/TTL-2) form the main data for the study and are presented in Table 1. In addition, the bar graphs in Figure 1 present participants' scores in a more visual form.

TABLE 1
Participants' WI and VKS Scores Expressed in Percentages

Participant	Word Identification		Vocabulary Knowledge Scale	
	TTL - 1	TTL - 2	TTL - 1	TTL - 2
ESL: Earl	53.09	69.49	42	50
Elly	79.15	91.31	54	54
Eve	80.89	92.69	56	72
Eli	82.18	89.31	48	58
Ed	94.51	93.05	86	84
ESL Average	**77.96**	**87.17**	**57.20**	**63.60**
ESL Median	**80.89**	**91.31**	**54**	**58**
NES: Joe	69.71	68.73	60	88
Ken	81.71	91.31	80	100
Sue	84.97	84.75	64	88
Jon	86.49	87.2	50	66
Kim	89.58	98.26	64	82
Jan	89.78	87.84	64	88
Don	93.22	96.44	88	100
NES Average	**85.07**	**87.79**	**67.14**	**87.43**
NES Median	**86.49**	**87.84**	**64**	**88**
Overall Average	**82.11**	**87.53**	**63.00**	**77.50**
Overall Median	**83.57**	**90.31**	**62**	**83**

Participants' Vocabulary Knowledge

Participants' scores on the word identification section of the TTL at the beginning of the term (TTL-1) reveal that as they enter the **GST** academic discourse community they already have a fair amount of *breadth* of specialized theological vocabulary knowledge. For all twelve participants, the average WI score on the TTL-1 was 82.11%. For the ESL participants (n = 5), the average WI score was 77.96%, while for the NES group (n = 7) it was 85.07%. As Table 1 reveals, there is obviously some individual variation, with one clearly lower score in each of the ESL (Earl[10], 53.09%) and NES (Joe, 69.71%) groups. However, in terms of *depth* of specialized vocabulary knowledge, participants' TTL-1 VKS scores are comparatively lower and there is more range within each group. For all twelve participants, the average VKS score on the TTL-1 was only 63%, with the ESL and NES group averages being 57.20% and 67.14% respectively.

Participants' Vocabulary Acquisition

If we consider participants' improvement on the TTL-2 to reflect their specialized vocabulary acquisition in this academic

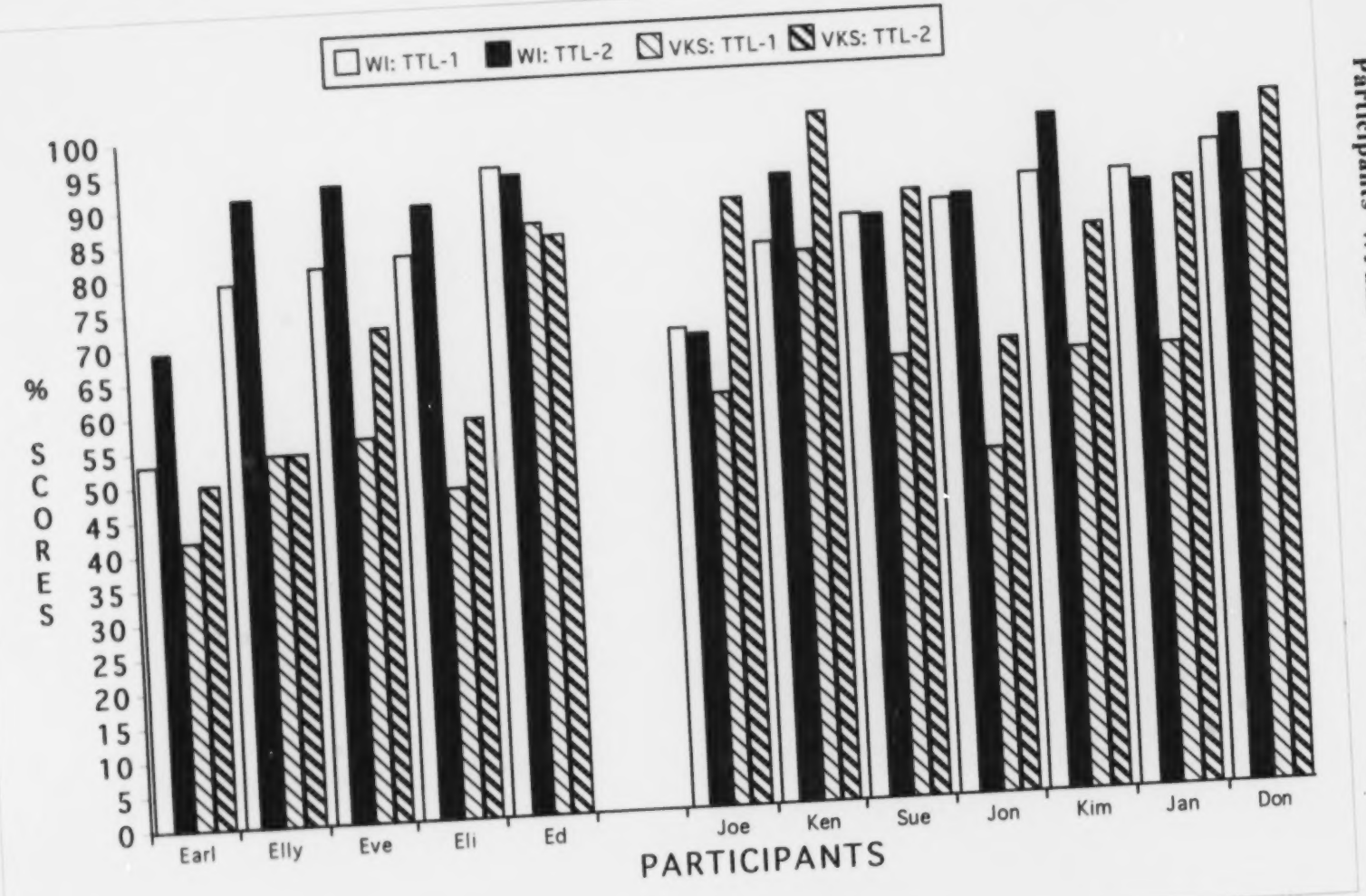

FIGURE 1
Participants' WI and VKS Scores Expressed as Percentages

discourse community, the overall WI average score of 87.53% indicates that specialized theological vocabulary learning did take place. On the TTL-2, the ESL group average WI score was 87.17% (up almost 10%) and NES participants averaged 87.79% (up almost 3%). Also, improvements in the group's overall VKS scores on the TTL-2 are even more pronounced, with the average for the twelve being 77.50% (up 14.5% from 63%). Interestingly, though, the second VKS average in the ESL group was only 63.60% (up from 57.20%), while the NES participants averaged 87.43% (up over 20% from 67.14%). Again, there are notable individual differences. On the WI section, for example, one ESL and three NESs' scores declined slightly (about 1% or less). For the VKS section, one ESL participant's score remained the same and another's went down by 2% (1 test point) on the TTL-2, and as a group, the ESL participants clearly saw less improvement on their second VKS scores than on their second WI scores. But the overall and ESL/NES group average scores do increase for both sections of the TTL-2. Thus it may be concluded that at the end of their first core theology course, most participants in the study have indeed improved their breadth and depth knowledge of specialized theological vocabulary, as seen in the gains outlined here.

ESL/NES Group Comparisons

The TTL data outlined in Table 1 and Figure 1 also reveal some key differences between the ESL and NES groups in this study. First, although WI scores on the TTL-1 suggest that both groups bring quite a bit of specialized vocabulary knowledge to their new studies, they also reveal that the ESL group's scores tend to be lower than those of NESs. This is evident in the ESL TTL-1 average of 77.96% on the WI section, compared with the NESs' 85.07% average. The ESL TTL-1 average score of 57.20% in the VKS section, compared with the NES average of 67.14% further bears this out. These findings suggest that ESL students who enter a new English-language theological discourse community appear to have both less breadth and depth in their specialized vocabulary knowledge than their NES counterparts. Again, however, there are individual differences. Ed, an ESL participant who was formerly an English teacher in Hong Kong, actually obtained the highest WI score on the TTL-1 with 94.51%, more than the highest NES score of 93.22% (by Don, who was also an English teacher).

Second, at the end of the first core course, this gap in breadth of specialized vocabulary knowledge of theological terms between the ESL and NES groups appears virtually closed on the TTL-2 WI section, when the ESL group average score was 87.17%, compared with the NES group average of 87.79%. Thus the previous difference of approximately 7% between the L1 and L2 group averages on the TTL-1 all but disappears with the TTL-2 results. However, the same cannot be said for the beginning- and end-of-term group differences in depth of vocabulary knowledge, as seen in the TTL-2 VKS scores. While the ESL group average here did increase from 57.20% on the TTL-1 to 63.60% on the TTL-2, the NES group average score increase from 67.14% to 87.43% (more than 20%) is even more pronounced. In essence, the gap between ESL and NES group scores here increased from a TTL-1 difference of just

under 10% to almost 24% on the TTL-2. This finding suggests that while both groups increase the depth of their specialized theological vocabulary knowledge, overall NESs in this study seem to have done so at a greater rate than ESL participants. This finding is further evident in the fact that all NESs improved on the TTL-2 VKS, while one ESL participant received the same score and another actually saw his score slightly decrease.

In summary, the case study data reveal, in response to the first research question, that 1) both ESL and NES participants begin their studies at the **GST** with a fair amount of breadth of specialized theological vocabulary knowledge, and 2) all but one (Ed) participant's TTL-2 scores revealed that they had indeed increased their knowledge in the specialized vocabulary of their chosen discipline. In answer to the second research question, ESL participants begin their **GST** studies with less breadth and depth in their knowledge of theological terminology than NESs, but the gap in breadth knowledge appears to be largely closed at the end of their first core theological course. In terms of depth of specialized vocabulary knowledge, however, NESs not only begin their key theological studies with more, but they also acquire greater depth of theological vocabulary knowledge during their first core course than their ESL counterparts. These and other findings will be briefly discussed in the following section.

Discussion

In interpreting these findings, one must recognize several limitations of the present case study. First, the number of participants (12) is relatively small, which makes for limited generalizability of the results. Second, the study represents only one case -- students in a particular theology course taught by one professor at one **GST**. Third, the present findings and discussion are primarily based on the quantitative data outlined above, and more analysis, especially from a qualitative perspective, needs to (and will) be carried out (see Lessard-Clouston, in progress). However, these limitations do not negate the main purpose of the study, which was to consider the specialized vocabulary knowledge and acquisition of ESL students entering an English-language theological discourse community and to compare these with the experience of their NES counterparts.

While the above summary views the ESL and NES groups as rather homogeneous, the study's findings also reveal the very individual nature of vocabulary knowledge and acquisition, supporting previous conclusions in studies by Lessard-Clouston (in press b) and Parry (1991)[11]. Although the TTL tested word identification and vocabulary knowledge of 69 specialized theological terms, participant's knowledge and use of these (and the distractors in the WI section) was varied, with no two participants responding in exactly the same fashion. With the WI section of the TTL, for example, each participant's list of theological terms (and distractors) selected was unique. On the TTL-2, as well, even though both Ken and Don received perfect VKS scores of 100%, their paraphrases and example sentences reveal their own personal knowledge and use of the ten target items.

Beyond the individual nature of the participants' knowledge and acquisition of specialized theological vocabulary is the study's variation of test results. Although there are similar scores within the ESL and NES groups, there are also important individual distinctions. In comparing ESL and NES WI scores on the TTL-1, for example, it is interesting that Ed appeared to have more breadth of vocabulary knowledge entering the programme than all of the other participants, including NESs. Yet Ed and three NESs (Joe, Sue, and Jan) also saw slight decreases in their TTL-2 WI scores. Ed is again an interesting case when we consider that his was the only TTL-2 VKS score to go down slightly, with one other participant (Elly) maintaining the same score and all other ESL and NESs seeing increases ranging from 8 to 28%.

At first it appeared problematic that some participants' TTL scores (especially in WI) had decreased. However, two important points are worth noting. First, beyond the WI section scores are the actual number of distractors and correct theological terms chosen. As Table 2 shows, the WI results for the four participants just mentioned nonetheless allow for specialized vocabulary learning to have taken place, because although they chose slightly fewer correct theological terms on their TTL-2, they also chose fewer distractors which they had previously identified as theological on their TTL-1. Sue, for example, had chosen four distractors on the first test, but chose none on the second one. Similarly, Jan chose seven distractors on TTL-1 but only one on TTL-2. As the data in Table 2 also suggests, all participants appear to have learned some theological items, because they chose words on TTL-2 that they had not identified the first time they saw them on TTL-1. Second, a study by Schmitt (1996) of the behaviour of four measures of vocabulary knowledge also revealed conflicting results but overall vocabulary acquisition. Including a written checklist test like Meara and Buxton (1987) and the Eurocentres' 10K Vocabulary Size Test (Meara and Jones, 1990), both of which are similar to the TTL WI section, Schmitt (1996) also found that an analysis of individual results "reveals that the different tests produce sometimes quite different vocabulary size estimates", resulting in contradictory estimates of breadth of vocabulary knowledge (p. 38).

In considering the commonalities and differences between ESL and NESs' vocabulary knowledge and acquisition, two further points are noteworthy. First, NESs appear to have more confidence in completing both the WI and VKS sections of the test. On both WI tests, for example, NESs tended to choose more distractors than ESL participants, as Table 2 shows. Although this may suggest overconfidence, one wonders why ESL participants did not choose more distractors. With the VKS section, ESL participants 1) appeared to choose (d) much less often than NESs, and 2) wrote fewer sentences. Ed, for instance, chose (c) for eight of the ten words on TTL-1, but for the same items on TTL-2 he chose (c) five times and (d) three times, even though his TTL-2 example sentences reflected a clear understanding of the meaning and use of the items. Second, looking again at the bar graphs in Figure 1 it is clear, as stated earlier, that ESL participants have made their greatest gains in vocabulary breadth (on WI), while for

TABLE 2
Participants' Number of Words Chosen/Missed on the WI Task

	TTL - 1		TTL - 2		Learned?	Missed	Never
Participant	Correct	Distract.	Correct	Distract.	(T2/not T1)	(T1/not T2)	Identified
ESL: Earl	32	1	41	0	17	8	8
Elly	47	1	54	1	7	0	5
Eve	48	1	55	3	7	0	4
Eli	49	2	53	2	7	3	3
Ed	56	3	55	1	1	2	2
NES: Joe	42	2	41	1	9	10	8
Ken	49	3	54	1	6	1	4
Sue	51	4	50	0	5	6	3
Jon	52	5	52	3	3	3	4
Kim	53	1	58	1	6	1	0
Jan	54	7	52	1	3	5	2
Don	55	0	57	2	3	1	1

NESs the largest gains were most often in vocabulary depth (on the VKS). This fact is not surprising when you consider that NESs had higher WI scores to begin with. But apart from Jan, whose TTL-2 WI and VKS scores were virtually the same, and Jon and Kim, whose WI scores remained higher, more than half of the NESs' VKS scores on the TTL-2 were higher than their highest WI scores. Strikingly, in no case was this true with an ESL participant.

Looking at the TTL scores, over the term in the Systematic Theology course NESs appear, overall, to have attained greater depth than ESL participants in the specialized vocabulary on the VKS section. One possible explanation for this finding may lie in what Meara (1992b) has termed "lexical structure" or "lexical organization" (Meara, 1996). In a view of lexical competence as a vocabulary network, lexical organization involves the "connections that link each of the items in the network, the average distance between randomly selected items in the network, and so on" (Meara, 1996, p. 48). An important point is that lexical organization "is a property of the vocabulary as a whole, not just characteristic of individual words" (p. 48). Although the VKS task in the present study aims to provide some knowledge of individual vocabulary items, what is relevant from Meara's (1996) work is the fact that the connections he writes about exist on a number of levels within one's lexical structure and involve a fairly high "degree of connectivity" (p. 49). Meara (1996) thus postulates that "...each item in an L2 lexicon might be directly linked to only a very small number of other words, and that in general, L2 words have a smaller number of shared associations than would be the case in an L1 lexicon" (p. 49).

Conjecturing somewhat, one can imagine that the NESs in this study were relating the specialized vocabulary that they were

acquiring to other vocabulary links or shared associations within their overall lexical organization in English. If, as Meara suggests, the links for ESL participants are less numerous and involve a smaller number of associations, it would naturally take longer for them to develop the specialized vocabulary depth that NES participants seem to be attaining with target theological items in the VKS section of the TTL. Consider an important TTL-2 example. In the left margin at the top of the WI section, Sue drew a line from the boldface word "theological" in the instructions and wrote: "*What do you mean? Used only in theo.? Or in conjunction w. theo.?*" Answers to these important questions would perhaps help Sue make the necessary links and associations with theological vocabulary that she assumed I was asking. These questions in and of themselves suggest that Sue was making, or at least attempting to make, some of the links and associations that Meara describes as part of lexical organization.

With this background, a closer look at Sue's TTL-2 WI results in Table 2 may also explain why her score decreased slightly, although she may well have been making the links and connections Meara (1996) outlines. On the second test Sue chose one fewer correct theological term, but also chose no distractors (one less than on TTL-1). She identified five new correct items that she had not listed on her first test, but also appeared to have "missed" six correct items that she had previously identified on the TTL-1: conversion, homiletic, cosmological, enlightenment, illumination, and foreordination. Conjecturing once again, it is very possible that for Sue words such as enlightenment, illumination or conversion no longer had the "only in theology" association they might have held when she wrote TTL-1, but the five following words that she seems to have acquired during the Systematic Theology I course nonetheless do: modalism, foreknowledge, pneumatology, teleological, and decree. As Meara notes, current tests like the TTL were not designed to measure the connections he speaks of, but in considering Sue's specific vocabulary choices on both tests, we can still imagine some possible links and associations in her lexical organization.

What the example with Sue appears to illustrate is the complexity of specialized vocabulary knowledge and acquisition, and how changeable it may be. Like Parry's (1993) conclusion, this aspect of the present findings indicates that "vocabulary learning is clearly a gradual business" (p. 125). In the case of ESL learners in an English-language theological discourse community, acquiring the specialized vocabulary of their academic discipline appears to be a very gradual business, at least in terms of depth of lexical knowledge. The positive finding here is that ESL participants do nonetheless appear to create some specialized word identification associations in their lexical organization, as suggested in their WI score improvements. A related reality in the gradual business of vocabulary acquisition is, as Schmitt (1996) declared in describing the variation in his findings, that the data in Table 2 may simply suggest that "we should view total vocabulary size as something always in flux, where words are forgotten as well as gained" (p. 39). This view would offer another possible explanation in Sue's case.

The difficulty of measuring individuals' vocabulary knowledge and acquisition is a point that requires further discussion. Read (1993) has outlined several current measures of L2 vocabulary knowledge. The present study used the TTL to measure something of participants' breadth of specialized theological vocabulary knowledge (how many words they know) through WI, as well as depth of specialized vocabulary knowledge (how well specific words are known) through the VKS. In doing so, the TTL involved a combination of checklist (WI), self-report, and verifiable response (VKS) formats. However, as noted above, it appeared that the NESs here were more confident in their checklist and self-evaluation aspects of the TTL. Does this then suggest that by the nature of the tasks ESL participants might have been biased against in the study? NESs, such as Joe, may have also been less confident, but the question remains.

A related issue concerns the VKS section of the TTL. It appears to have been adapted successfully for this study, and many participants' long paraphrases or definitions for (c) or (d) responses meant that the elicitation of vocabulary knowledge provided good data. However, in terms of the verifiable sentence examples, several questions remain. Asking participants to use specialized vocabulary items in a sentence may reveal syntactic or grammatical information, but it often leaves little room for verifying semantic understanding. In the case where Jan chose (b) on the TTL-2, for example, she crossed out the "I **don't know** what it means" and wrote "I forget". Interestingly, she had checked (c) and (d) previously and crossed them out as well. She then gave a paraphrase for ontological -- "something re. the argument for the proof of the existence of God" (correct) -- and went on to provide a good example sentence: "One of the arguments for the existence of God was the ontological argument". This answer was given five points, but the issue remains that Jan was unsure of the meaning but was able to provide a grammatically and semantically correct sentence. In hindsight, participants could have written something correct here such as, "Ontological is a word I've seen several times in my text book", but it would have been very difficult to rate such an example, or to say how well the person actually knows the word. The data here suggest a sentence context may be useful, but it is also insufficient, especially if future studies aim to look at the knowledge of word associations and lexical organization, as Meara (1996), Read (1993), and Schmitt (1996) have suggested.

To conclude the discussion of the findings it is useful to consider briefly several implications of the present results for ESL and EAP education. First, as I have discussed elsewhere (Lessard-Clouston, 1994, in press b), the fact that specialized vocabulary acquisition takes places in this type of discourse community indicates that it would be helpful for advanced ESL and EAP courses to train learners in vocabulary learning strategies that will assist them not only in their ESL or EAP classes but also in their academic studies in English. Second, as the ESL participants here were able to attain a breadth of specialized theological vocabulary knowledge similar to that of their NES counterparts by the end of their first core course, students in

ESL and EAP courses should be encouraged to be exposed to the specialized vocabulary of their chosen disciplines, through readings, textbooks, etc. One practical way to do this within ESL and EAP courses would be to use thematic study units from various academic disciplines, as Parry (1993) has suggested, or to create individualized class assignments (involving readings, interviews, presentations, etc.) where students may be exposed to and gain some experience in using the specialized vocabulary of their future disciplines. Third, the major finding concerning the ESL participants' lack of improvement in depth of specialized vocabulary knowledge, in comparison with NESs, suggests that much more must be done *before* ESL/EAP students enter their academic studies in order to create 1) an awareness of this situation and 2) a deeper understanding of the complexities of specialized vocabulary knowledge and acquisition. In cases like the **GST** where new ESL students usually need to obtain a TOEFL score of 550 or more (or have completed their undergraduate studies in English), a need still exists to assist them in mastering a deeper level of specialized vocabulary knowledge during the early months of their programme. At the **GST** an EAP class was offered (mostly for ESL students) during the fall term of the study, but none of the participants were enrolled in it. A concurrent EAP class incorporating the above suggestions might be a start in helping ESL students overcome some of the challenges they face in acquiring the specialized language of this discourse community.

Conclusion

This study has considered 12 ESL and NESs' knowledge and acquisition of specialized theological vocabulary in one English-language academic discourse community. After briefly outlining relevant literature, the development of a Test of Theological Language was described. This TTL was administered at the beginning and end of the participants' first core theology course, and it was found that both ESL and NES participants enter their studies in this context with a fair knowledge of specialized theological terms. At the end of the course, ESL participants' breadth of knowledge of theological vocabulary was virtually the same as that of NESs, but NESs had made much greater gains in their depth of vocabulary knowledge of the target items than the ESL participants. These and other findings have been noted, and a number of issues discussed as a result. Both measuring and acquiring specialized vocabulary knowledge in academic contexts are extremely complex, as this study indicates.

Notes

1. I am grateful to Birgit Harley, Merrill Swain, and Alister Cumming, the members of my committee, for their input on this and the larger dissertation study, and to Wendy Lessard-Clouston for her insightful comments on this paper and her assistance in many aspects of its preparation. Appreciation must also be expressed to the **GST** and to the 12 participants, without whose active participation this study could not have been completed.

2. Eve (ESL) and Don (NES) each took two courses (half a full load), while the other 10 participants took four courses plus their field education credit, for a total of 17 credit hours. Two others, Elly (ESL) and Sue (NES) also audited an extra class, in Christian Ethics and Contemporary Theology respectively. It was later discovered that Elly had actually begun her degree studies part-time the previous winter term (in January) by taking one night course that term and another again in the summer session.

3. The same four texts were also required for the winter term Systematic Theology II course.

4. Only terms that appeared several times in the course notes and/or hand-outs were included. A helpful glossary at the back of the McGrath (1994) text was also consulted. In the end, it included 22 (or 32%) of the 69 theological vocabulary items used on the TTL. Of these 18 were for word identification and four appeared in the vocabulary knowledge scale section.

5. In their vocabulary knowledge scale, Paribakht and Wesche (1993 and 1996) ask test takers to provide either a synonym or translation if they select (c) or (d). However, as participants in this study were being socialized into a new academic discourse community, it was anticipated that some might be learning new vocabulary and/or concepts for which they may not know a synonym or translation. As a result, the option of providing a paraphrase was also given on the TTL.

6. The phrase "Image of God", for example, appeared repeatedly in the course notes and texts, but was deemed too obvious for the WI section, and was moved to the VKS section of the final TTL.

7. This change and finding were interpreted as revealing a weakness in the VKS in Paribakht and Wesche (1993 and 1996). In essence, the previous VKS did not allow participants to further demonstrate their knowledge about the target words for which they chose (a) or (b). In effect, this VKS allowed participants to *overestimate* their knowledge of a word (by letting them provide an incorrect translation or model sentence, for example), but might also reflect an *underestimation* of their knowledge of particular (a) or (b) items for which they were not given the opportunity to provide an example sentence but could use correctly in context. For my purposes, this information was deemed relevant, because the example might reveal syntactic or semantic knowledge about the item. In the revised TTL's VKS

section the participant was thus given the choice of providing sentences for all options.

8. In determining the correctness of VKS responses, any semantic or syntactic discrepancies were verified in the Elwell (1984) dictionary noted above. In the end, no participants provided translations, with all giving paraphrases or definitions. Interestingly, only one participant (Jan) provided a sentence for items marked (a) or (b), once. In that case she also wrote a paraphrase beside it. See more about this is the discussion.

9. The second rater holds a Master's degree in education and followed the scoring process outlined.

10. Names used here are pseudonyms. For easier reference, those that begin with "E" (Earl, Elly) denote ESL participants, while those beginning with other letters refer to NES participants.

11. See also Meara (1993) for a discussion on individual differences in L2 vocabulary acquisition.

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APPENDIX

Test of Theological Language

Name: _____

A. Word Identification

Please read the following list of words and phrases. Circle (i.e. circle) those which are ***theological*** *words or phrases. You do not need to spend a lot of time on each item. In fact, it is preferable that you give your first impression. Example: 1. (sin)*

1. theodicy
2. carcinogenic
3. colostomy
4. trigeminal
5. conversion
6. optimal
7. homiletic
8. phatic communion
9. prostatism
10. modalism
11. omniscience
12. foreknowledge
13. polysemous
14. inspiration
15. fricative
16. dogmatics
17. evaporative
18. resurrection
19. adsorption
20. atheism
21. inerrancy
22. deism
23. somatic
24. hyperthyroidism
25. creed
26. precipitator
27. pneumatology
28. sanctification
29. oncology
30. mutagenic
31. apologetics
32. consumption
33. deity
34. redemption
35. cosmological
36. epistemology
37. expiation
38. harmatology
39. interpretation
40. illocutionary act
41. aspiration
42. providence
43. sacrament
44. dispensationalism
45. mycosis
46. creation
47. salience
48. trinity
49. fideism
50. canon
51. evil
52. luminescent
53. predestination
54. trichotomy

55. epenthesis
56. ecumenical
57. absinthism
58. authority
59. quadratic equation
60. eschatology
61. gnosticism
62. vertical equity
63. justification
64. enlightenment
65. confession
66. distractor
67. circle of willis
68. Calvinism
69. immutability
70. metathesis
71. vocative
72. carbonaceous
73. christological
74. duopsony
75. pushfulness
76. impactor
77. teleological
78. transcendence
79. ministry
80. election
81. liturgical
82. monetarism
83. revelation
84. residual
85. toluene
86. salvation
87. double counting
88. polytheism
89. illumination
90. atonement
91. free will
92. ecclesiology
93. lithotomy
94. foreordination
95. decree
96. simulation
97. meteorology
98. sovereign
99. omnipotence
100. fundamentalism

PLEASE CONTINUE ON THE NEXT PAGE...

B. Vocabulary Knowledge Scale

Please show how well you know each of the words or phrases below. Check off (✓) the appropriate line and follow the instructions for each option. If at all possible, please make a sentence for each word, especially if you choose either (c) or (d).

1. Arminianism

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

2. creationist

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

3. doctrine

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

4. filioque

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means_____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

5. hermeneutic

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

6. Image of God

___ (a) I don't remember having seen this phrase before.
___ (b) I have seen this phrase before but I don't know what it means.
___ (c) I have seen this phrase before, and I *think* it means_____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this phrase. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this phrase in a sentence. (Please make a sentence): _____
_____.

7. incarnation

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

8. monotheism

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

9. ontological

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

10. soteriology

___ (a) I don't remember having seen this word before.
___ (b) I have seen this word before but I don't know what it means.
___ (c) I have seen this word before, and I *think* it means _____
_____.(Please give a paraphrase, synonym, or translation)
___ (d) I know this word. It means _____.
(Please give a paraphrase, synonym, or translation)

I can use this word in a sentence. (Please make a sentence): _____
_____.

Thank you for completing this Test of Theological Language. Michael L-C.